

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 2 of 22

Listing of Claims

The following list of claims will replace all prior versions and listings of claims in the application.

1-4. (Canceled)

5. (Currently Amended) ~~The~~A resist composition of ~~claim 1~~, comprising a silane-containing resist polymer, wherein the ~~silane~~silane-containing resist polymer ~~further comprises isoprene~~.

6. (Canceled)

7. (Currently Amended) The resist composition of claim ~~[[1]]~~ 5, wherein the ~~silane~~silane-containing resist polymer further comprises ~~isoprene and styrene~~.

8. (Currently Amended) A resist composition, comprising a ~~silane~~silane-containing resist polymer, wherein the ~~silane~~silane-containing resist polymer comprises ~~an element selected from the group consisting of silystyrene, vinylsilane or a combination thereof~~.

9. (Canceled)

10. (Currently Amended) ~~The~~A resist composition of ~~claim 1~~, comprising a silane-containing resist polymer, wherein the ~~silane~~silane-containing resist polymer comprises a polymer formed by a hydrosilylation of isoprene.

11. (Currently Amended) ~~A~~The resist composition of claim 10, ~~comprising a silicon-containing resist polymer, wherein the silicon-containing resist polymer comprises a polymer formed by hydrosilylation of isoprene and the hydrosilylation agent is selected from the group consisting of dimethylphenyl silane, triethylsilane, and dimethylethylsilane~~.

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 3 of 22

12. (Previously Presented) A resist composition, comprising a silicon-containing resist polymer, wherein the silicon-containing resist polymer comprises poly(dimethylphenylvinylsilane-b-isoprene) having a molecular weight between about 17,800 and about 22,100.

13. (Previously Presented) A resist composition, comprising a silicon-containing resist polymer, wherein the silicon-containing resist polymer comprises poly(trimethylsilylstyrene-b-isoprene) having a molecular weight between about 10,700 and about 28,700.

14. (Currently Amended) ~~The~~ A resist composition of ~~claim 1~~, comprising a silane-containing resist polymer, wherein the ~~silicon~~silane-containing resist polymer comprises poly(styrene-b-isoprene) having a molecular weight between about 5,500 and about 21,800.

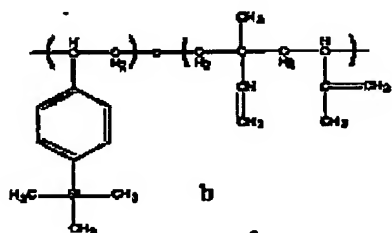
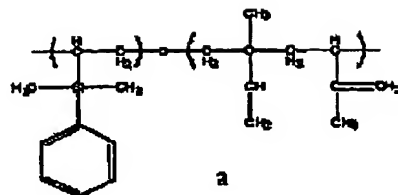
15. (Currently Amended) The resist composition of claim ~~[[1]]~~ 14, wherein the ~~silicon~~silane-containing resist polymer comprises poly(styrene-b-isoprene) having a molecular weight between about 5,500 and about 5,700.

16. (Currently Amended) The resist composition of claim ~~[[1]]~~ 14, wherein the ~~silicon~~silane-containing resist polymer comprises poly(styrene-b-isoprene) having a molecular weight between about 7,200 and about 21,800.

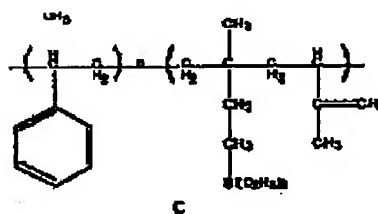
17-18. (Canceled)

19. (Previously Presented) A resist composition, comprising a silicon-containing resist polymer, wherein at least a portion of the silicon-containing resist polymer comprises a structure selected from the group consisting of:

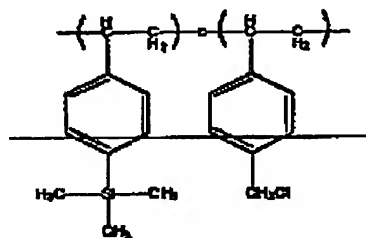
In re: Dai et al.
 Application No.: 10/800,195
 Filed: March 12, 2004
 Page 4 of 22



, and



20. (Currently Amended) A resist composition, comprising a silicon-containing resist polymer, wherein at least a portion of the silicon-containing resist polymer comprises a structure selected from the group consisting of

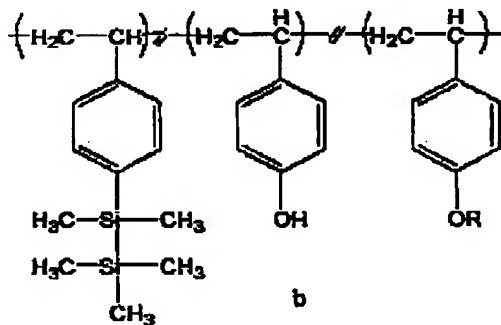
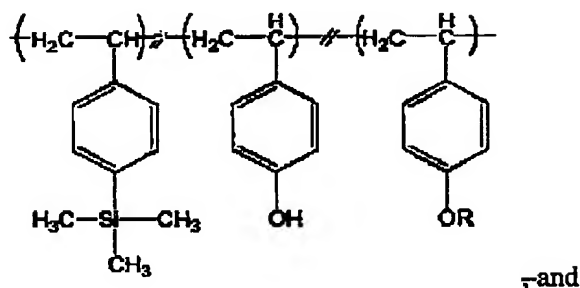
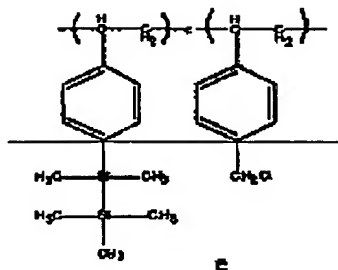


In re: Dai et al.

Application No.: 10/800,195

Filed: March 12, 2004

Page 5 of 22



wherein R represents a protecting group.

21. (Original) The resist composition of claim 20, wherein the protecting group R is selected from the group consisting of t-butyloxycarbonyl, trimethyl silane, and ethoxymethyl.

22-23. (Canceled)

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 6 of 22

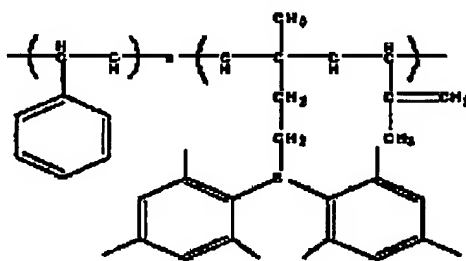
24. (Currently Amended) A resist composition, comprising a boron-containing resist polymer, wherein the boron-containing resist polymer comprises less than about 1 weight percent boron.

25. (Currently Amended) The resist composition of claim 24, wherein the boron-containing resist polymer comprises a boron concentration of up to about 2×10^{22} atoms per cubic centimeter.

26. (Currently Amended) The resist composition of claim 24, wherein the boron-containing resist polymer comprises an element selected from the group consisting of carborane, carborane carboxylic acid, dimesitylborane, isoprene, styrene, vinyl compounds and combinations thereof.

27-31. (Canceled)

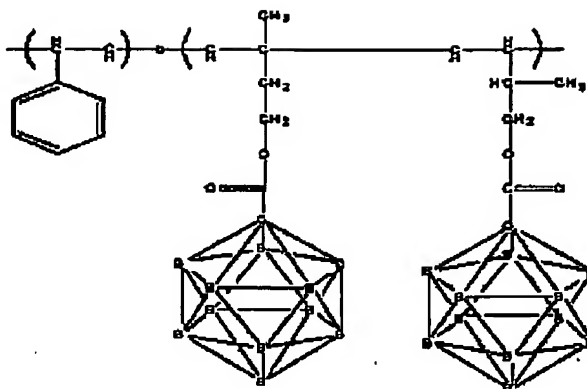
32. (Previously Presented) A resist composition, comprising a boron-containing polymer, wherein the boron-containing polymer comprises a polymer having the structure:



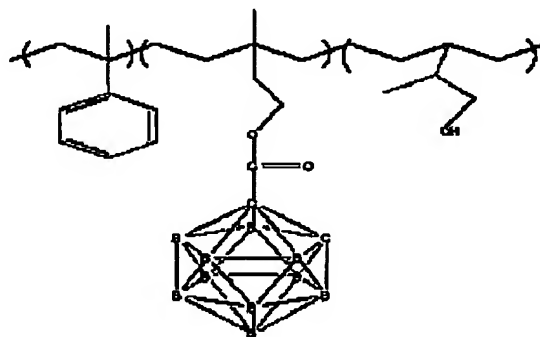
33. (Original) The resist composition of claim 32, wherein the resist composition comprises less than about 1 weight percent boron.

34. (Previously Presented) A resist composition, comprising a boron-containing polymer, wherein the boron-containing polymer comprises a polymer having the structure:

In re: Dai et al.
 Application No.: 10/800,195
 Filed: March 12, 2004
 Page 7 of 22



35. (Previously Presented) A resist composition, comprising a boron-containing polymer, wherein the boron-containing polymer comprises a boron-containing polymer having the structure:



36-37. (Canceled)

38. (Currently Amended) The method of claim 37, A method of forming a silane-containing resist copolymer, comprising: copolymerizing a monomer and a silane-containing monomer to form the silane-containing resist copolymer, wherein the silane-containing monomer is selected from the group consisting of silystyrene and vinylsilane.

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 8 of 22

39. (Currently Amended) The method of claim ~~[[37]]~~ 38, wherein the monomer ~~comprises a polymer~~ is selected from the group consisting of isoprene, ~~styrene~~, and vinyl compounds.

40. (Currently Amended) The method of claim ~~[[37]]~~ 38, wherein the ~~silicene~~ silane-containing resist copolymer comprises between about 0.1 percent and about 40 percent by weight silicon.

41-43. (Canceled)

44. (Currently Amended) A method for forming a boron-containing resist polymer, comprising: performing a hydroboration or esterification reaction of a boron-containing group with a resist polymer.

45. (Currently Amended) ~~The method of claim 44~~ A method for forming a boron-containing resist polymer, comprising: performing a hydroboration or esterification reaction of a boron-containing group with a polymer, wherein performing a ~~the~~ hydroboration reaction of ~~a~~ the boron-containing group with ~~a~~ the polymer comprises performing ~~a~~ the hydroboration reaction using dimesitylborane as a the hydroboration agent to introduce dimesitylborane into the polymer.

46. (Original) The method of claim 44, wherein performing an esterification reaction of a boron-containing group with a polymer comprises performing an esterification reaction to introduce carborane into the polymer.

47. (Original) The method of claim 46, wherein the carborane comprises carborane carboxylic acid.

48. (Currently Amended) The method of claim 44, wherein the polymer comprises a polymer selected from the group consisting of isoprene, styrene, vinyl

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 9 of 22

compounds, poly(styrene-b-isoprene), hydroxylated poly(styrene-b-isoprene), poly(styrene-b-hydroxystyrene), and poly(α -methylstyrene-b-hydroxystyrene).

49-50. (Canceled)

51. (Currently Amended) A method for increasing the reactive ion etch resistance of a resist polymer, comprising incorporating boron atoms into the resist polymer, wherein incorporating boron atoms into the resist polymer further comprises performing hydroboration of the resist polymer or performing an esterification reaction of the resist polymer and a carborane.

52. (Currently Amended) ~~The method of claim 51~~ A method for increasing the reactive ion etch resistance of a polymer, comprising incorporating boron atoms into the polymer, wherein incorporating boron atoms into the polymer further comprises performing hydroboration of the polymer, wherein the hydroboration agent comprises dimesitylborane.

53. (Canceled)

54. (Previously Presented) The method of claim 51, wherein the carborane comprises carborane 1-carboxyl chloride.

55. (Currently Amended) A method for increasing the reactive ion etch resistance of a resist polymer, comprising incorporating boron atoms into the resist polymer, wherein the resist polymer comprises a polymer selected from the group consisting of isoprene, styrene, vinyl compounds, poly(styrene-b-isoprene), and hydroxylated poly(styrene-b-isoprene), poly(styrene-b-hydroxystyrene), and poly(α -methylstyrene-b-hydroxystyrene).

56. (Currently Amended) A method for increasing the reactive ion etch resistance of a resist polymer, comprising incorporating boron atoms into the resist

In re: Dai et al.
Application No.: 10/800,195
Filed: March 12, 2004
Page 10 of 22

polymer, wherein the boron atoms have a concentration in the resist polymer of up to 2×10^{22} atoms per cubic centimeter.

57-63. (Canceled)

64. (Currently Amended) ~~The method according to claim 59,~~ In a method of making a feature on a substrate by: (a) coating said substrate with a resist composition comprising a polymer; (b) exposing the resist composition to extreme ultra-violet radiation; and then (c) reactive ion etching said resist to form the feature thereon, the improvement comprising:

including silane in said polymer, wherein said feature has at least one dimension less than 50 nm.

65-66. (Canceled)